

6. ALTERNATIVE SPATIAL DEVELOPMENT STRATEGIES

6.1 Introduction

As part of the development of the Waterford PLUTS, various spatial options were considered at both the strategic and local level. This was deemed to be a necessary prerequisite to the selection of a preferred spatial strategy for the City.

The strategies established and tested may be set out at two levels:

- At sub-regional level covering Waterford City and its Hinterland including the satellite towns of New Ross, Carrick-on-Suir and Tramore;
- At local level covering Waterford City and Environs.

The areas are indicated in **Figure 1.1 – Study Area**.

This chapter sets out the spatial development options as follows:

- In Sections 6.2 to 6.4, discussion relates to the sub-regional distribution of population and jobs and the relationship between Waterford City and the towns in its hinterland. Three strategies are considered and one is selected. The assumed relative population levels for the selected sub-regional strategy are reflected in **Figure 6.1**.
- In Sections 6.5 to 6.9, alternative strategies for the spatial development of Waterford City and its immediate environs are considered. Each alternative is described in Section 6.5 and illustrated separately in **Figures 6.3–6.5**. The strategic assessment of the alternatives is given in Section 6.6. The determination of the preferred strategy is subsequently described in Sections 6.7 and 6.8.

6.2 Waterford City and its Hinterland: Alternative Strategies

At sub-regional level, three scenario options for the distribution of a total population, projected using national and regional growth parameters, were considered.

Scenario One: Present Trends

This option examined the recent patterns of growth in Waterford City and Environs, the towns and rural areas in the period from 1991 to 1996 (the latest period for which solid evidence is available). The objective of this strategy option was to continue the relative shares of growth experienced in each of the towns and settlements over the next twenty years.

Scenario Two: City and Satellites

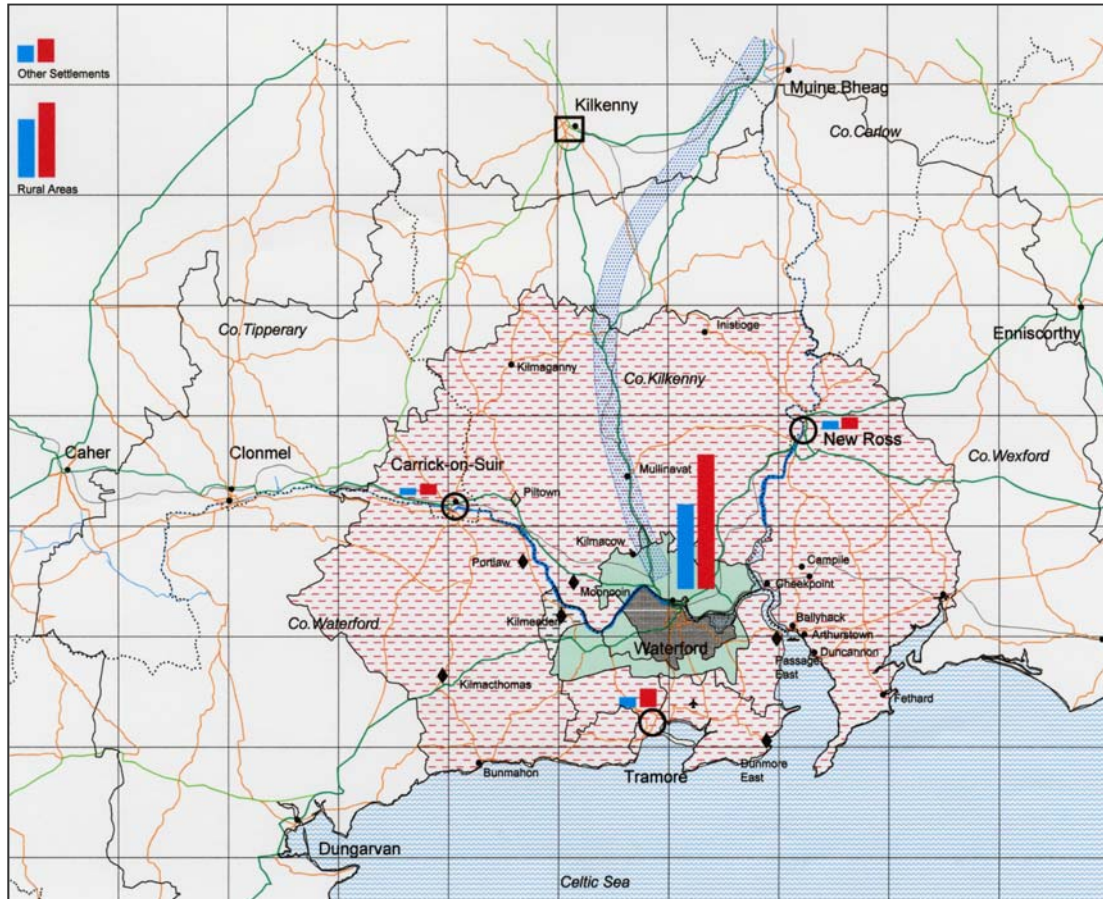
This option assumed that future employment growth would be allocated to Waterford, New Ross, Carrick-on-Suir and Tramore, in accordance with their relative 1996 populations. The objective of this strategy option was to focus growth on Waterford with a relative balance of jobs-led growth in each of the major satellite towns.

Scenario Three: City Focus

This option concentrates employment and residential development on Waterford City and Environs. The City Focus option was derived from the objectives of establishing Waterford as a viable Gateway City in the South-East and ensuring the most sustainable land-use development pattern within the PLUTS Study Area, in conformity with national and regional guidance.



Figure 6.1 Population Assumptions



6.3 Waterford City and its Hinterland: Appraisal of Alternatives

The appraisal of alternative spatial development options at a sub-regional level was carried out using two principal assessment tools that were specifically developed for the Study.

Goals Achievement Matrix

An appraisal of the three alternative development options for Waterford City and its hinterland was undertaken using a Goals Achievement Matrix (GAM). The GAM was based upon the project goals and objectives and was essentially a qualitative assessment, backed up by quantitative data where it was available. The quantitative data was taken from the Waterford Traffic Model. Details of the resulting GAM are set out in **Appendix J**.

The GAM evaluation concluded that Scenario 3 (City Focus) has an edge over the other two alternatives, with Scenario 1 (Present Trends) providing what is considered to be the weakest spatial strategy. Whilst the differences between the alternative strategies are likely to be relatively small in the early phases of the plan, the differences will become more marked over time, as the effects of the City Focus strategy become more apparent. Thus, although the City Focus strategy would start by providing marginal advantages at the outset of the plan period, it would eventually provide substantial benefits by 2020 and beyond.

Travel Demand Assessment

The travel demand implications of the alternative sub-regional strategies were evaluated using the Waterford Traffic Model, which is a strategic transport assessment model. The model calculated travel demand arising from the continued growth of the PLUTS Study Area and demonstrated how demand varies depending on how that growth is spatially arranged. The model took account of rising car ownership and changing travel patterns and was based on the development of a gravity generation and distribution model to predict travel demand.

The assessment is summarised below in **Table 6.1** in terms of projected overall traffic growth, future modelled traffic speeds and journey times in the PLUTS Study Area in 2020.

Table 6.1 Travel Demand Analysis: Strategies Compared

	Present Trends	City and Satellites	City Focus
Total Trips	55,664	56,112	55,761
Total Vehicle kilometres	689,290	673,045	665,180
Total Vehicle hours	17,834	17,794	19,590
Average Vehicle Speed (kph)	38.6	37.8	34
Average Trip Length (km)	12.4	12	11.9

Spatial strategies that minimise the need for trip making, distance travelled and time spent travelling are preferred in accordance with the objectives of the NSS.

From **Table 6.1** above it can be seen that Scenario 1 (Present Trends) contributes to the lowest number of total trips and the highest vehicle speeds. However, it also results in the highest number of vehicle kilometres and the longest average trip length as a consequence of the dispersed settlement pattern. This is at odds with the NSS, which aims to develop sustainable settlement patterns and reduce travel distance from employment, services and leisure facilities. Scenario 2 (City and Satellites) contributes to the lowest number of vehicle hours (or time spent travelling) but the highest number of total trips. Scenario 3 (City Focus) results in the lowest number of vehicle kilometres and the lowest average trip lengths. This means that more trips are generated in or near the City and that trips are shorter overall due to the more compact City form in line with the objectives of the NSS. However, due to the additional congestion arising from the concentration of urban development in the City, total travel time under the City Focus Scenario is greater and average vehicle speeds are slightly lower than for the alternative scenarios.

Comparing the results from the City Focus Strategy with Present Trends indicates that the City Focus Strategy contributes similar levels of growth in travel demand, approximately 10% less growth in vehicle kilometres and the lowest average trip length. While the City Focus Strategy indicates higher levels of overall travel time, this reflects the higher number of trips in the urban area with the attendant potential of congestion delays. These delays can be mitigated by concerted intervention in the form of road network development and public transport provision.

It should be noted that the travel demand analysis is made at a coarse strategic level before the interventions of public transport and urban population distribution were considered in detail.

The City Focus Scenario also results in the lowest level of car ownership. The Present Trends Scenario results in the highest level of car ownership, while the City Focus Scenario has the lowest level, but only marginally.

Taken in the round, the travel demand analysis confirms the clear merit of a City Focus spatial strategy.

6.4 Waterford City and its Hinterland: Preferred Strategy

The City Focus Strategy was selected because:

- It reflects the objective of establishing Waterford as a viable Gateway City in the South-East;
- It represents the most sustainable land-use development pattern within the PLUTS Study Area and conforms to national and regional guidance;
- It ranks highest in transportation terms, using the transportation model developed for the Study;
- It also ranks highest in the appraisal process using a Goals Achievement Matrix.



The City Focus strategy calls for:

- Employment led growth to be focussed on Waterford City and Environs;

- Additional growth to be taken from other Gateways and redirected to Waterford;
- Car based commuting to be maintained at existing levels.

The allocations of population and workers under the City Focus sub-regional spatial strategy are set out in **Tables 6.2 and 6.3**.

Table 6.2: **Population Distribution in PLUTS Study Area - City Focus**

	2000 Population	2020 Population	Growth Population
City and Environs	52,750	81,519	28,769
Satellites	20,600	34,714	14,114
Other settlements over 500 persons	8,286	12,049	3,763
Remaining (rural) area	34,055	34,996	941
TOTAL	115,690	163,278	47,588

Table 6.3: **Workforce Distribution in PLUTS Study Area - City Focus**

	2000 Workers	2020 Workers	Growth Workers
City and Environs	23,802	36,974	13,172
Satellites	9,295	15,634	6,339
Other settlements over 500 persons	3,739	5,427	1,688
Remaining (rural) area	15,366	15,761	395
TOTAL	52,202	73,795	21,593

It should be stressed that the above analysis did not involve a detailed assessment of land use planning in the areas outside Waterford City and Environs, but focussed on approximating the likely outcome of a City Focus policy, together with the settlement policies set out in the relevant County Development Plans.

6.5 Waterford City and Environs: Alternative Strategies

Three strategies for the spatial development of Waterford City and Environs to 2020 are presented in this section. They have been developed to illustrate different ways of ordering the growth of Waterford. They use as a starting point the distribution of population and workforce set out in the City Focus or preferred sub-regional strategy for Waterford and its hinterland.

These strategies arise from:

- The vision statement and goals;
- National and regional policy reviews;
- An examination of the development opportunities and constraints that have been identified, including issues relating to further river crossings;
- Existing established policies and committed infrastructural projects;
- Good planning principles.

The strategies are initially constrained by the zoning proposals of the current Development Plans of Waterford City and Kilkenny County Councils but may imply zoning revisions in the next plan period. Many land use decisions have already been taken, so that the strategies outlined here only begin to affect the spatial development of the City gradually and towards the end of the Study period.

It should be stressed that these are simply indicative strategies. Each strategy attempts to reflect a different emphasis and comprises an internally consistent set of assumptions to ensure a coherent approach. Components of each option have been combined to provide a preferred strategy. The starting point for each strategy is the existing zoned lands, which are shown in **Figure 6.2**.

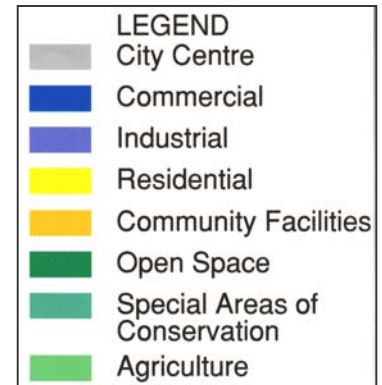
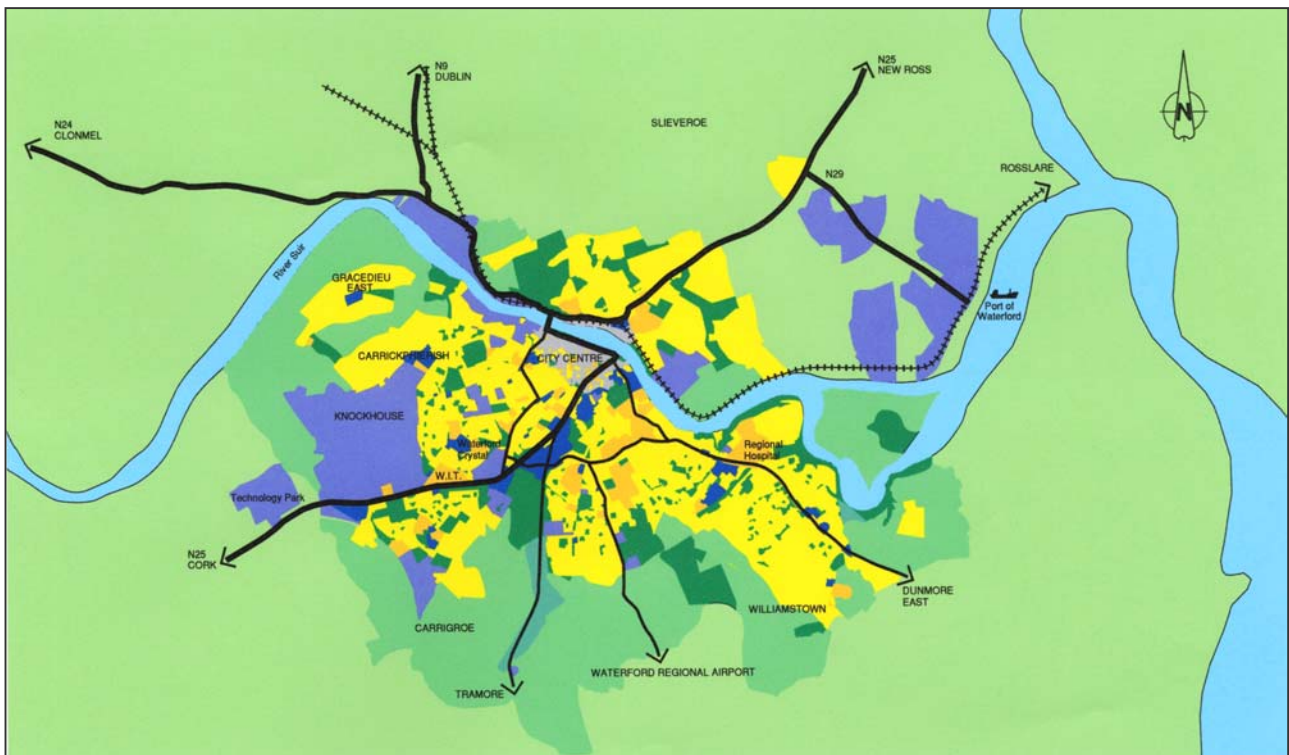


Figure 6.2 Existing Land Uses



The Alternative Strategies

Strategy A Creating a Concentric City (Northern Emphasis)

Under this strategy, the growth of Waterford would be concentrated to the north of the River, in order to create a City that is broadly concentric around the existing core. This means that the bulk of population growth in the twenty-year period would be in Ferrybank and the Kilkenny suburbs.

The key to this strategy is the development of the North Quays as a northward extension of the existing City Centre with a major emphasis upon retail and office uses. The logic of this strategy demands a Downstream River Crossing, linked as closely as possible to the Outer Ring Road, as well as a pedestrian and cyclist bridge in the City Centre to link the increased employment and residential activity on the North Quays with the existing City Centre. Much of the land currently zoned for residential development on the southern edge of Waterford would not be required during this period under Strategy A.

Strategy B Southern Emphasis

Under this strategy, the spread of the City to the south-east and south-west would be reinforced by new development and infrastructure supporting this direction of growth. Population growth would continue to concentrate on Waterford City in the proportion of 80/20 south of the River. Only slow growth would occur in the Northern Suburbs in County Kilkenny. Almost all allocated development areas south of the River would need to be developed to meet forecast demand.

As regards employment growth, the emphasis would be upon the high-tech sectors, with industrial parks close to the university receiving particular support. A proportion of the growth in retail and other City Centre activities would occur on sites to the south of the City Centre.

Key uses in the redeveloped North Quays would include leisure, tourism and mixed residential/office developments. The South Quays would be redeveloped for specialist shopping and recreational and entertainment facilities as the natural extension to the existing City Centre.

The construction of a Downstream River Crossing may be less critical than under Strategy A.

Strategy C Balancing Future Growth

Under this strategy, growth would be split more evenly north and south of the River in order to create a more balanced City, although the main core and bulk of development would remain to the south. A little over half of allocated development areas south of the River would need to be developed to meet forecast demand.

As in Strategy A, the key to this strategy would be the development of the North Quays as a northward extension of the existing City Centre, with a major emphasis upon retail and office uses. There would also be a high emphasis upon employment uses at this location in order to reduce growth at peripheral locations.

The redevelopment of the South Quays for specialist shopping and recreational and entertainment facilities would also be consistent with this option.

This strategy demands a Downstream River Crossing linked as close as possible to the Outer Ring Road linking areas south of the River to the Belmont area and the

Port area at Belview. It also demands a pedestrian and cyclist bridge in the City Centre to link the North Quays directly to the existing City Centre.

The distinguishing elements of each of the alternative spatial strategies for Waterford City and Environs are shown in **Table 6.4**.



Figure 6.3 (a) The Concentric City (Northern Emphasis)

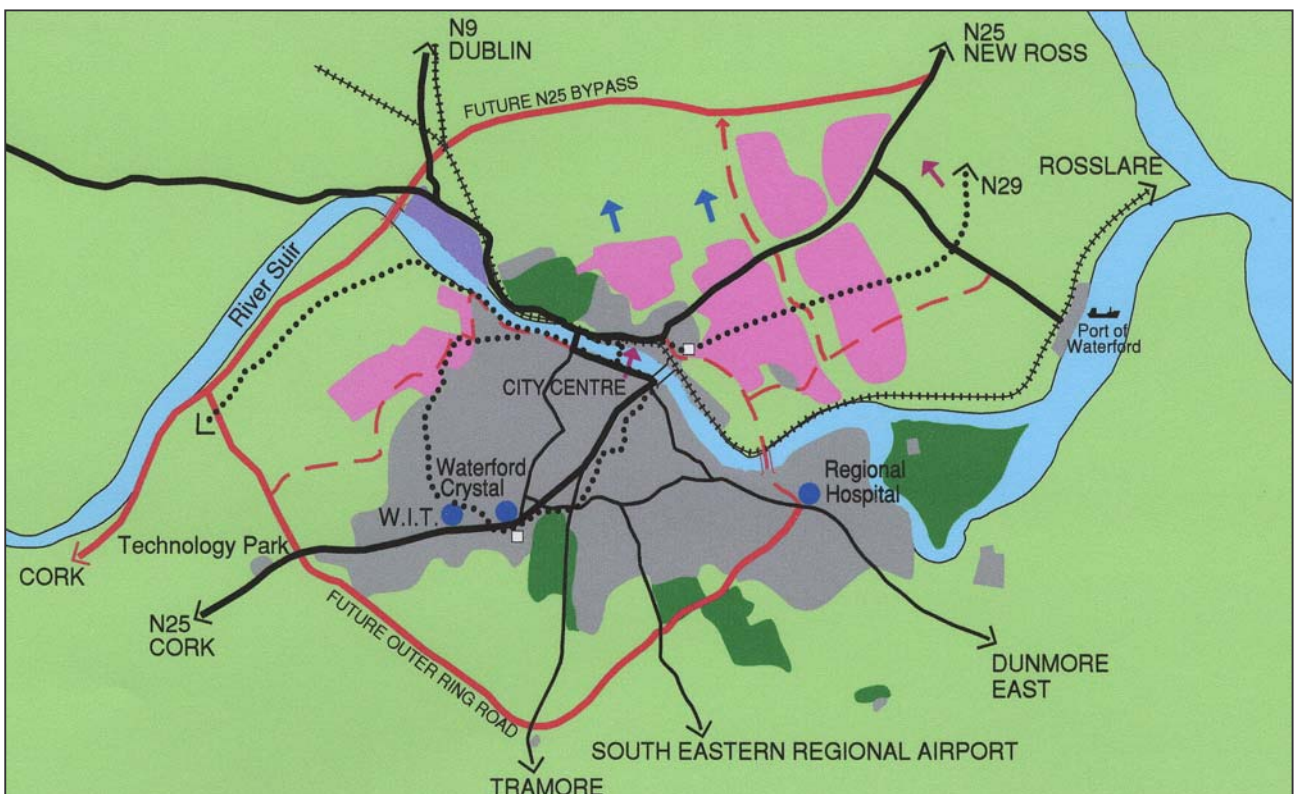


Figure 6.3(b) The Southern Emphasis City

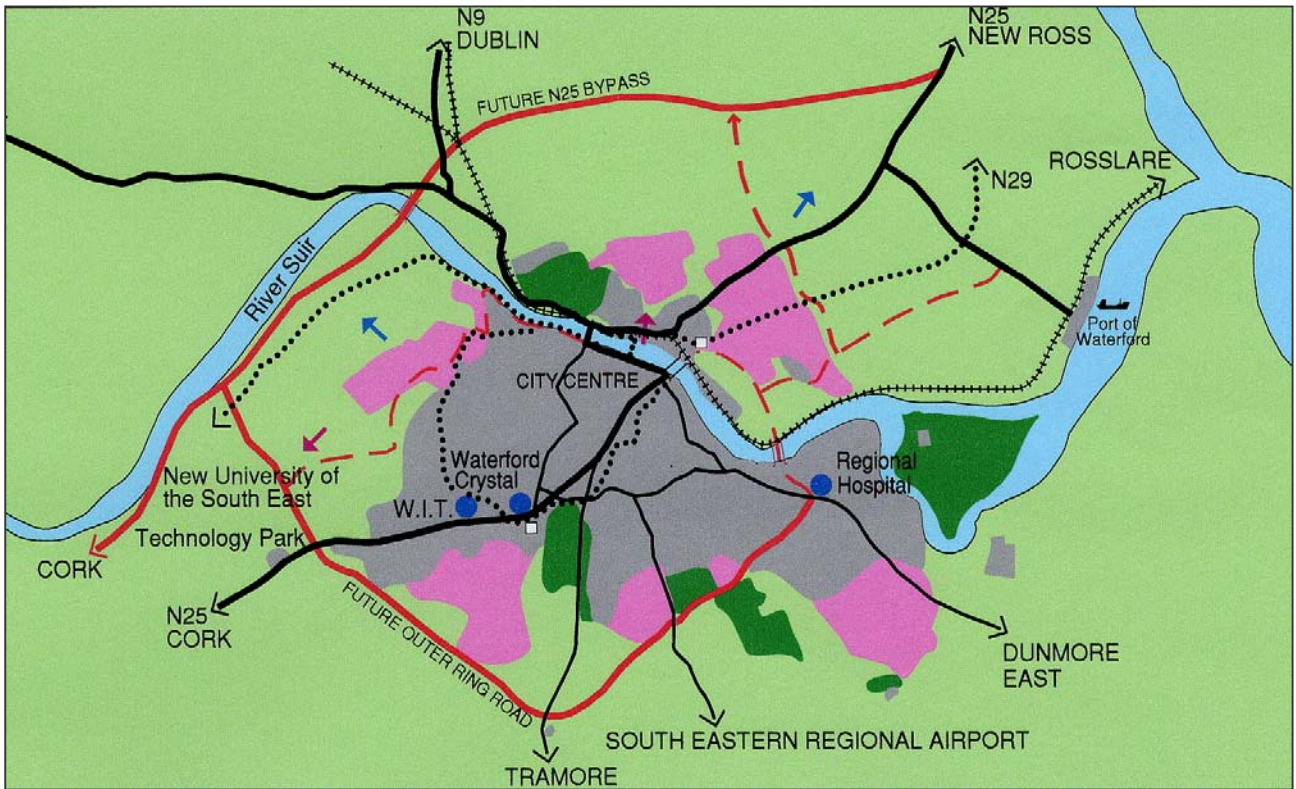


Figure 6.3(c) The Balanced City

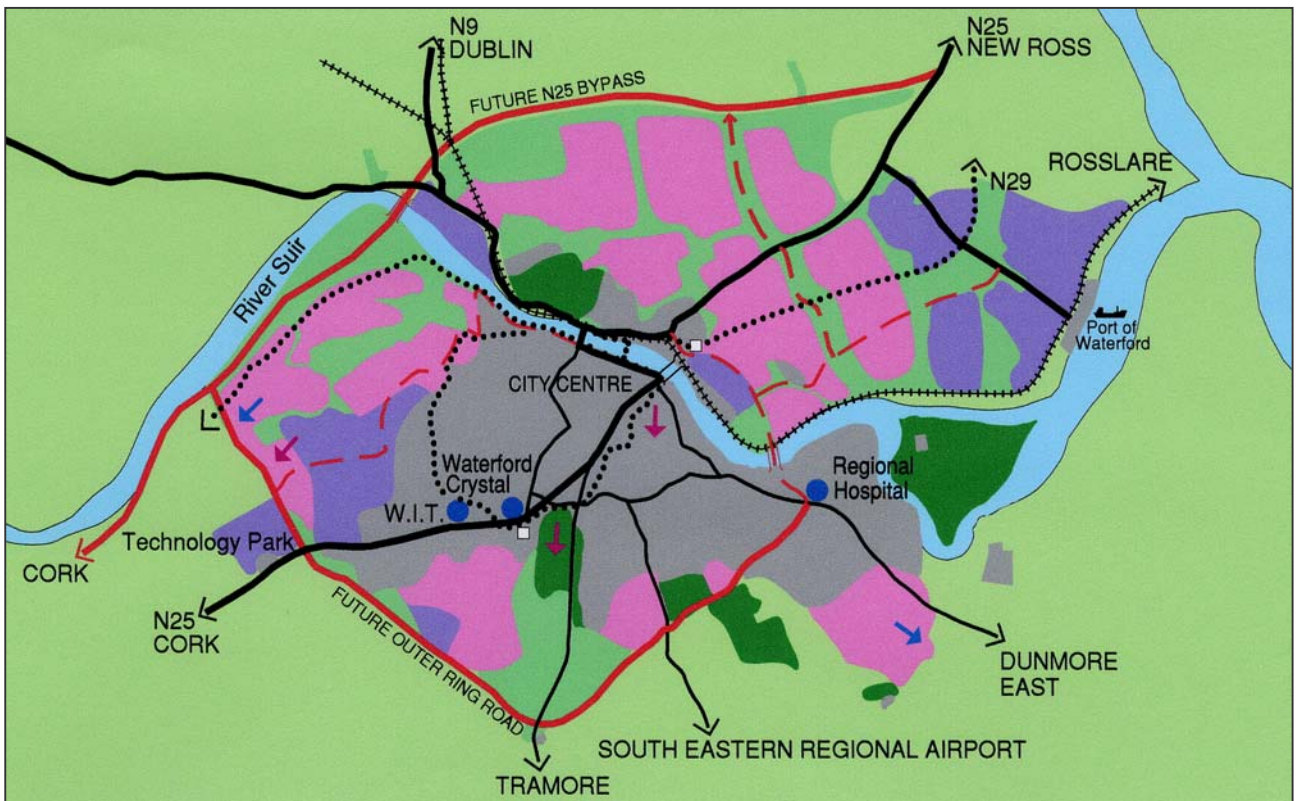


Table 6.4: Distinguishing Elements of Alternative Strategies for Waterford City and Environs

	Strategy A - Creating a Concentric City	Strategy B - Southern Emphasis	Strategy C - Balancing Future Growth
Main Theme	<ul style="list-style-type: none"> Balancing City by concentrating bulk of new growth to north of the River to create a concentric city as soon as possible. 	<ul style="list-style-type: none"> Spread of City to south-east and south-west reinforced by new development and infrastructure supporting this direction of growth. 	<ul style="list-style-type: none"> Growth to be split more evenly north and south of the River in order to create a more balanced City, although the main core and bulk of development remains to the south.
Industry	<ul style="list-style-type: none"> No further business parks to south of City. 	<ul style="list-style-type: none"> Further business parks developed south of the City. 	<ul style="list-style-type: none"> Possible business park north of the River.
Education	<ul style="list-style-type: none"> Consideration of a technology related campus extension adjacent to Waterford Technology Park. 	<ul style="list-style-type: none"> Consideration of a technology related campus extension adjacent to Waterford Technology Park. 	<ul style="list-style-type: none"> Consideration of a technology related campus extension adjacent to Waterford Technology Park.
Residential	<ul style="list-style-type: none"> Population growth to occur largely north of the River. Kilkenny suburbs developed to their maximum extent consistent with environmental constraints. Much of zoned land to south not required. 	<ul style="list-style-type: none"> Population growth to continue to concentrate south of River in Waterford City. Only slow growth in Northern Suburbs in County Kilkenny. 	<ul style="list-style-type: none"> Population growth split evenly north and south of the River, with steady growth in both the City and in County Kilkenny.
Retail & Offices	<ul style="list-style-type: none"> North Quays developed as northward extension to the existing City Centre, with a major emphasis on retail and office uses. 	<ul style="list-style-type: none"> Key uses in re-developed North Quays include leisure, tourism and mixed residential/office developments. South Quays to be redeveloped for specialist shopping and recreational and entertainment facilities as natural extension to existing City Centre. Additional comparison shopping south of existing centre towards Outer Ring Road. 	<ul style="list-style-type: none"> North Quays developed as northward extension to the existing City Centre, with a major emphasis on retail and office uses. Complementary redevelopment of South Quays for specialist shopping and recreational and entertainment facilities.
Transport	<ul style="list-style-type: none"> Third crossing critical, probably linked as close as possible to Outer Ring Road. Increased employment and residential activity north of River to create potential for development of a commuter ferry between North and South Quays. 	<ul style="list-style-type: none"> Construction of a Downstream River Crossing may be less justified than under Option A. 	<ul style="list-style-type: none"> Downstream River Crossing very important to the realisation of this option.

Spatial Distribution of Alternative Strategies

The population distributions associated with each of the strategies are set out in **Table 6.5**. This indicates the forecast growth or additional population under each of the strategies.

Table 6.5: Forecast Population Distribution Under Three Spatial Strategies

Strategy North/South	Population Change 2000-2020		
	North	South	Total
A (80/20)	23015	5754	28769
B (20/80)	5754	23015	28769
C (50/50)	14385	14385	28769

It should be noted that the area considered under these strategies is narrower than the City and Environs and comprises the City plus the DED of Kilculliheen in County Kilkenny. This is because it is proposed to limit the growth of the City to this area, with growth elsewhere in the environs being organic in nature.

Under **Strategy A**, where there is a considerable emphasis on development north of the River, there is a shortfall of available zoned and undeveloped land to the north. The Strategy requires that some 23,000 persons are accommodated north of the River, but there is sufficient land to accommodate only some 13,000. In order to achieve the required population target under this strategy, therefore, either the proposed densities (which have been accepted from the Kilkenny Waterford Environs Plan) must be increased, or additional lands must be zoned. At the same time, only 22% of zoned land south of the River is used, with the development of Gracedieu dispensing with the need for development in any other location.

Strategy B can be achieved using existing zoned and undeveloped lands, without shortfalls, and leaving a little over 10% 'headroom'. About two-thirds of the proposed development south of the River would be in the Gracedieu and south-western areas, in conformity with the City development plan. North of the River, there would be no requirement to develop the "Arcadian"-zoned areas in Kilkenny. Headroom would be considerable - close to 100% of requirements.

Strategy C provides for a considerable increase in the headroom to the south (about 80% of requirements) whilst confining developments to the north to within the existing zoned lands, with some tightening of densities (there is a slight shortfall of land using the densities assumed). Development would not be required in the south-eastern quadrant of the City.

6.6 Waterford City and Environs: Assessment of Alternatives

Strategies B and C were evaluated in relation to the project goals (as stated in **Chapter 1**) and this is summarised in the Goals Achievement Matrix (GAM) given in **Appendix K**. Strategy A was not assessed. Although it is a valid development path and was included in the text in order to demonstrate one possible direction in which the City could move, it is regarded as impractical to implement it as it is not in sufficient conformity with established plans and policies in the short to medium term. Its role in the Study has been to set out a particular direction which is then used as a

stock onto which other hybrid strategies can be grafted – Strategy C in the first instance and other derived strategies set out thereafter.

Longer Term Assessment of Strategies - Post 2020

Such is the scale of available land within the City and Environs that it is unlikely that it would all be developed even within a thirty-year period. The total capacity of undeveloped industrial sites and major office locations amounts to some 50,000 persons –sufficient for a population of at least a quarter of a million persons, when the knock-on impact of local service provision is added.

Although it is possible to make an assessment of strategies simply on the basis of development outcomes over a twenty-year period, it is also valuable to assess the validity of the direction being taken, in terms of its final outcome. In this case, this is deemed to be when the full development of industrial land has taken place and the concomitant population and service sector employment expansion has taken place.

Under Strategy B 2020+, the bulk of further development would be south of the River Suir and much would have to move beyond the line of the Outer Ring Road. There would also be pressure for further shopping development along the line of the Outer Ring Road, with the risk of a dilution of the role of the City Centre.

Under Strategy C 2020+, development would move both north and south in equal proportions, with a continuation of the balanced City approach. The Outer Ring Road would mark the boundary to development to the south. Further shopping provision of a local nature would be required in the north.

6.7 Waterford City and Environs: Conclusions

Both Strategies B and C performed well in meeting the Study goals and objectives as set out in the Vision for Waterford. However, Strategy C was preferred for the following reasons:

- It is likely to foster the growth and development of the City more effectively than Strategy B as it requires far greater emphasis on extending the City Centre onto the North Quays, thus creating the opportunity to strengthen and complement the retail, employment, recreational and tourist attractions of the existing City Centre;
- It puts emphasis on residential development north of the River, which will be well located to serve the Belview industrial area(s) and the redeveloped North Quays.
- In terms of travel demand, it performs best in operational terms. The results of the assessment showed that Strategy C has the lowest associated vehicle kilometres and travel times and the highest network speeds of the alternatives tested.

The only objective in which Strategy B has a clear advantage is in delivery, since implementation of Strategy C would require far greater co-ordination between local authorities.

Before 2020 the difference between the two strategies is likely to be small but should be more marked in the post 2020 period. In the long-term, the benefits of a spatial planning approach based upon Strategy C are likely to be far more pronounced as outlined above.

6.8 Modifications for Preferred Strategy

Strategy C is the preferred strategy of the alternatives considered for Waterford City and Environs. However, there are clear reasons why Strategy C as outlined above cannot be adopted without further modification. These are as follows:



- Firstly, it is clear from the travel demand model that the approach outlined in Strategy C would not in the short-term resolve the serious issues of traffic congestion which currently characterise Waterford, particularly but not exclusively, if the Downstream River Crossing were not provided within the time span of the proposed plan. The iterative nature of the land-use planning process requires that land-use in the short to medium term should be modified to assist in the alleviation of traffic problems which will not be fully resolved by proposed investments and management measures.
- Secondly, the Strategy still does not fully reflect the committed policy stances that exist in a number of areas including the disposition of lands for both residential and industrial/commercial development;
- Thirdly, the Strategy may not fully take into account the strength of market pressures that will arise from committed infrastructural investment, in particular the construction of the N25 By-pass and the southern section of the Outer Ring Road.

In short, both the pressure of the market, the momentum of development and the concomitant zoning regime make a southern emphasis more achievable in the shorter term, but a preferred strategy, whilst recognising this reality, should seek to alter the pattern of development to a more balanced one for the reasons already stated.

In recognition of this, a synthesis of B and C was developed as the preferred scenario. This is judged to be the best development path that can be achieved and one that will reach a position of balanced development, whilst taking on board all relevant constraints. The details of the preferred strategy are set out in **Part A** of this document.

